

VESSEL SURFACE RECONSTRUCTION WITH A TUBULAR DEFORMABLE MODEL

ABSTRACT

An apparatus, article of manufacture, and method for modeling an
5 elongated object located internal to a body (e.g., blood vessels such as the
carotid artery or the renal artery). Magnetic resonance data of the area of
concern is collected. The magnetic resonance data is analyzed, extracting
gradient information. The extracted gradient information may include the
gradient of the magnitude gradient. Contemporaneously, a tubular
10 coordinate system is interactively generated as an initial model of the artery.
An axis and a reference circumferential direction are defined for the
coordinate system with radial lines extending outward from the axis.
Intersecting radial lines are merged. All vertices at radial and circumferential
positions are initialized with the extracted gradient information. Then, the
15 initialized model is deformed subjecting initialized vertices to image and
smoothing forces, thereby completing the surface model of the artery,
effectively reconstructing the artery surface. The reconstructed artery
surface may be displayed on a display.